Atty. Docket: EEC-TWUL-P2

ADDENDUM

SUBMISSION OF CLEAN CLAIMS PURSUANT TO 37 CFR § 1.121

In compliance with 37 CFR § 1.121, the Applicants hereby submit a "clean" copy of the claims now pending in this application as follows:

1. A method for detecting and locating a common signal within two input signals using correlation based techniques, comprising providing at least one filter by analyzing the phase of the input signals in the frequency domain; filtering the input signals in the frequency domain using said at least one filter; and performing cross correlation of the filtered signals.

2. A method for detecting and locating leaks in a fluid carrying pipe using correlation based techniques, comprising: detecting two input signals from the fluid carrying pipe; analyzing the phase of the input signals in the frequency domain to provide at least one filter; filtering the input signals in the frequency domain using the at least one filter; and performing cross correlation of the filtered signals.

3. A method according to claim 1, wherein the signals are audio signals.

4. A method according to claim 1, wherein the at least one filter includes a first filter for suppressing frequencies which do not exhibit a sufficient degree of coherence.

5. A method according to claim 4, wherein the first

filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals for each of the plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.

6. A method according to claim 1, wherein the at least one filter includes a second filter for identifying regions in the frequency spectrum of a cross correlation function likely to exhibit a correlated phase between adjacent frequencies in its Fourier Transform.

7. A method according to claim 6, wherein the second filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals for each of the plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.

8. A method according to claim 6, further comprising calculating the time delay between the common signal in the input signals by tracking the phase difference between the input signals as a function of frequency using the second filter.

9. A method according to claim 6, further comprising

calculating variations in the time delay between the common signal in the input signals as a function of frequency using the second filter.

10. A method according to claim 6, further comprising using a third filter to remove frequencies which do not have sufficient amplitude.

11. A method according to claim 10, wherein the third filter is constructed using a method comprising: applying a digital threshold to the product of the spectra of the two input signals.

12. A method according to claim 1, wherein the at least one filter includes a fourth filter for compensating the input signals for dispersion effects.

13. Apparatus for detecting and locating a common signal within two input signals using correlation based techniques, comprising a computer including: means for providing at least one filter by analyzing the phase of the input signals I the frequency domain; means for filtering the input signals in the frequency domain using said at least one filter; and means for performing cross correlation of the filtered signals.

14. Apparatus for detecting and locating leaks in a fluid carrying pipe using correlation based techniques, comprising: detectors for detecting two input signals from the fluid carrying pipe; a computer including means for analyzing the phase of the input signals in the frequency domain to

provide at least one filter; means for filtering the input signals in the frequency domain using the at least one filter; and means for performing cross correlation of the filtered signals.

15. Apparatus according to claim 13, wherein the signals are audio signals.

16. Apparatus according to claim 13, wherein the at least one filter includes a first filter for suppressing frequencies which do not exhibit a sufficient degree of coherence.

17. An apparatus according to claim 16, wherein the first filter is constructed using a method comprising: selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals for each of a plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.

18. An apparatus according to claim 13, wherein the at least one filter includes a second filter for identifying regions in the frequency spectrum of a cross correlation function likely to exhibit a correlated phase between adjacent frequencies in its Fourier Transform.

19. An apparatus according to claim 18, wherein the second filter is constructed using a method comprising:

selecting at least one section from each of the two input signals; calculating the Fourier Transform for each section; calculating the average vector sum of the phase difference between the two input signals for each of a plurality of frequencies; and calculating the magnitude of the vector sum for each frequency.

20. An apparatus according to claim 18, including calculating the time delay between the common signal in the input signals by tracking the phase difference between the input signals as a function of frequency using the second filter.

21. An apparatus according to claim 18, including calculating variations in the time delay between the common signal in the input signals as a function of frequency using the second filter.

22. An apparatus according to claim 13, including a third filter to remove frequencies which do not have sufficient amplitude.

23. An apparatus according to claim 22, wherein the third filter is constructed using a method comprising: applying a digital threshold to the product of the spectra of the two input signals.

24. An apparatus according to claim 13, wherein the at least one filter includes a fourth filter for compensating the input signals for dispersion effects.